REMARKS

In the Office Action dated December 23, 2004, claims 7-10 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sun.

Applicants note with appreciation that claim 11 was stated to be allowable if rewritten in independent form, however, the above rejection of claims 7-10 and 12 is respectfully traversed, and therefore claim 11 has been retained in dependent form at this time.

The circuit and analysis technique disclosed in the Sun patent are for the purpose of accurately discriminating atrial P-waves from far field ventricular events, such as far field R-waves, so that over-sensing such far field ventricular events as atrial sense events will be avoided, and so that under-sensing atrial events that occur within a fusion beat masked by the far field ventricular event in the atrial electrogram also will be avoided. Therefore, although the Sun et al reference has two channels, these two channels are respectively supplied with an atrial signal and a ventricular signal. In the circuit disclosed and claimed in the present application, by contrast, the same electrical signal proceeds to each of the (at least) two channels, and it is the same electrical signal that is processed in each of those channels.

Claim 7 as originally presented referred to "signals" (plural) but this was not intended to mean two separate and discrete signals in the sense of the atrial and ventricular signals that are separately processed in the Sun et al circuit. The use of "signals" in the original language of claim 7 was merely intended to mean that successive signals from successive heart beats continuously arrive and are processed in the claimed circuit. In order to avoid confusion on this point, however, claim 7 has been amended to refer to "signal" in the singular.

It should be noted, however, that the circuit disclosed and claimed in the present application can be used with multiple cardiac leads, but if this is done each signal from each lead is provided with its own detection circuit, so that each detection circuit still processes only one signal from one lead. This is clearly stated at page 5, lines 17-21 of the Substitute Specification.

In *each channel* of the heart signal detector of claim 7, the incoming signal is subjected to bandpass filtering, with the respective bandpass filters in the respective channels having different passbands from each other. In *each channel*, the bandpass filtered signal is supplied to a threshold detector, that generates an output signal if the bandpass filtered signal exceeds its threshold. The bandpass filtered signal also is supplied to a peak amplitude determining unit that generates a peak amplitude value of the bandpass filtered signal.

Each of these outputs (i.e. the signal from the threshold detector and the peak amplitude value from the peak amplitude determining unit) are supplied to a heart event identifying unit. This means, as shown in Figure 3, that *each channel* generates two outputs (designated in Figure 3 with reference numerals 18 and 20). If two detector channels are present, therefore, the heart event identifying unit will be supplied with four inputs.

The circuit disclosed in the Sun et al reference does not employ bandpass filters, but instead employs high pass filters. Moreover, there is no teaching in the Sun et al reference that the high pass filters 36 and 46 in the Sun et al circuit will have different filter characteristics. The Examiner acknowledged this fact, but stated that it would have been obvious to provide a higher frequency passband for the filter 46 than for the filter 36 because the frequency components of the R-wave compared to those of the P-

wave are naturally higher. This is not a statement that makes sense when applied to a high pass filter. The reason why the bandpass filters in the claimed circuit have different passbands is to make them sensitive to different types of waves in the signal, but the same concept does not apply to the Sun et al circuit, because the high pass filter 36 is already being supplied only with an atrial signal and the high pass filter 46 is already being supplied only with a ventricular signal. There is no need to set the filter characteristics of the filters 36 and 46 in the Sun et al reference to ensure that a particular type of signal will be discriminated, because it is already known in that circuit, by virtue of the hard-wired nature thereof, that only atrial signals will pass through the high pass filter 36 and only ventricular signals will pass through the high pass filter 46

Nevertheless, even if this factor is disregarded, the remainder of the Sun et al circuit does not operate as set forth in claim 7. Although the Sun reference refers at column 10, lines 49-50 to "digital peak detector processing," this is not the same as determining a peak amplitude *value*, as set forth in claim 7. In the Sun et al system, it is only important to know the time at which a peak value occurs, which is why trigger circuits 40 and 48 are employed. The output of each of those circuits is merely a trigger pulse, and does not contain any information regarding the actual peak amplitude value of the detected signal. The only thing that the trigger signal that is emitted by the trigger circuits 40 and 48 indicates is the time at which the peak value in the signal occurred. Dependent on this timing, an adaptive filter 52 is adjusted and further processing takes place for signals supplied to the morphology analyzer 44. The morphology analyzer 44, however, is not supplied with any information as to whether the signal in question exceeded a particular threshold, since it is assumed in the Sun et al circuit that the respective atrial and ventricular signals will always exceed the thresholds in the

respective trigger circuits 40 and 48, and the only information used in Sun et al is the identification of *when* the threshold is exceeded. Moreover, as noted above, there is no component anywhere in the Sun et al reference that detects a peak amplitude *value*, and therefore no such information is supplied to the morphology analyzer 44 in the Sun et al circuit.

Claim 7 as originally filed already referred to the respective filters in the detection channels having different passbands, and this being the case claim 7 has been editorially amended to consistently refer to the filters as bandpass filters throughout claim 7, and the dependent claims, and to refer to the filtered signal as a bandpass filtered signal.

For all of the above reasons, it is clear that the circuit dislcosed in the Sun et al reference does not have the same components as set forth in independent claim 7, nor due to the components in Sun et al individually or collectively operate in the manner set forth in claim 7. Claim 7, therefore, would not have been obvious to a person of ordinary skill in the field of detecting and identifying cardiac events based on the teachings of Sun et al under the provisions of 35 U.S.C. §103(a).

Claims 8-10 and 12 add further structure to the non-obvious combination of claim 7, and therefore would not have been obvious to a person of ordinary skill in the field of detecting and identifying cardiac events based on the teachings of Sun et al, for the same reasons discussed above in connection with claim 7.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

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